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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,271	12/23/2003	Helmar Van Santen	081468-0307331	4441
909	7590	07/19/2006	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			NGUYEN, HUNG	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
			2851	

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/743,271	<b>Applicant(s)</b> VAN SANTEN ET AL.	
	<b>Examiner</b> Hung Henry V. Nguyen	<b>Art Unit</b> 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-13,15-25 and 27-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,3-13 and 15-20 is/are allowed.
- 6) ☒ Claim(s) 21-25,27-30 and 32-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 3, 2006 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 30, 32-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 30, the recitation of “wherein an at least one immersion liquid outlet port is provided only on the substrate, or suspended above the substrate, or both” is indefinite and vague. It is not clearly understood how the liquid outlet port can be suspended above the substrate, as claimed. Please explain and clarify.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 21-22, 24, 30, 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Mizutani et al (US 2005/0264774 A1).

With respect to claims 21-22, 24, and 30, Mizutani et al discloses an immersion lithographic projection apparatus comprising all of the limitations of the instant claims such as: an illumination system (IL) configured to provide a beam of radiation; a support structure (MST) configured to hold a patterning device (M), the patterning device configured to impart the beam with a pattern in its cross-section; a substrate table (PST) configured to hold a substrate (P); a projection optical system (PL) configured to project the patterned beam onto a target portion of the substrate; a liquid system (1,2) configured to provide an immersion liquid to a space between the substrate and the projection system, the liquid supply system having at least one immersion

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liquid inlet port (4) not provided on the substrate table and wherein an at least one immersion liquid outlet port (4) is “suspended above” the substrate and is radially outwardly of the at least one immersion liquid inlet port (see figure 1), and the inlet port is mechanically isolated from the projection optical system and the immersion liquid is not substantially confined in the space so that the liquid can flow out of the space.

As to claim 33, Mizutani et al discloses the liquid inlet port (4) is separated and mechanically isolated from the projection system.

6. Claims 30, 33, 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Vogel et al (U.S.Pat. 6,867,844).

With respect to claim 30, Vogel et al discloses an immersion lithographic projection apparatus comprising all of the limitations of the instant claims such as: an illumination system (see col.7, lines 45-50) configured to provide a beam of radiation; a support structure configured to hold a patterning device, the patterning device configured to impart the beam with a pattern in its cross-section; a substrate table configured to hold a substrate (101); a projection optical system (102) configured to project the patterned beam onto a target portion of the substrate; a liquid system configured to provide an immersion liquid (LQ) to a space between the substrate and the projection system, the liquid supply system having at least one immersion liquid inlet port (105A) not provided on the substrate table and wherein an at least one immersion liquid outlet port (105A) is suspended above the substrate (see figures 1 and 4). Vogel et al further teaches at least one immersion liquid outlet port is radially outwardly, relatively to an optical axis of the projection optical system, of the at least one immersion liquid inlet port (see figure 4).

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As to claim 33, Vogel et al disclose the liquid inlet port (105) is mounted on the housing (103) and is mechanically isolated from the projection system.

As to claim 34, Vogel teaches the at least one immersion liquid inlet port being connected to a projection system frame (103) that supports the projection systems.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 25, 28-29, 32, 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani et al (US 2005/0264774 A1) in view of Schuster et al (U.S.Pat. 6,781,668).

With respect to claims 28-29, and 35-36, Mizutani et al discloses an immersion lithographic projection apparatus comprising substantially all of the limitations of the instant claim as discussed. Mizutani et al et al does not expressly disclose an actuator configured to adjust at least of the height and tilt of the barrier member relative to the object. Schuster et al teach an actuator configured to adjust at least the height and tilt of barrier member (9) relative to the object (see col.6, lines 11-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of the Mizutani et al and Schuster et al to obtain the invention as specified in the above claims of the present invention. It would have been obvious to a skilled artisan to utilize the actuator as taught by Schuster et al into

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the lithographic apparatus/method of Mizutani et al for the purpose of efficiently supplying the immersion liquid to the space between the projection system and the substrate.

As to claims 25, and 32, Mizutani as modified by Schuster et al lacks to show the distance between the substrate and the barrier member being at least  $50\mu\text{m}$  as recited in the claims. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the distance between the barrier member and the substrate as recited since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

9. Claims 23, 27 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani et al (U.S 2005/0264774 A1) in view of Lin (U.S.Pat. 6,788,477).

As to claims 23, 27 and 37, Mizutani et al discloses an immersion lithographic projection apparatus comprising substantially all of the limitations of the instant claims except for at least of immersion liquid outlet being provided on the substrate table or at least one immersion inlet port being connected to a base frame that supports the substrate table. Lin discloses an immersion exposure apparatus where a liquid outlet (32) is on the substrate table and an inlet port (30) is connected to a base frame that support the substrate table (see figure 2). In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Mizutani et al and Lin et al to obtain the invention as specified in claims 23 and 27 of the present invention. It would have been obvious to a skilled artisan to provide at least one inlet port and at least one outlet port on the substrate

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table for the purpose of supplying of new liquid and discharging of used liquid from the space between the projection lens and the substrate.

***Allowable Subject Matter***

10. Claims 1, 3-13, 15-20 were allowed.

***Response to Amendment/Argument***

11. Applicant's arguments in conjunction with the applicant's amendment after final filed 6/6/06 have been carefully considered. Claim 30 has been amended and new claim 27 has been added.

With respect to claim 27, in light of applicant's remarks on page 1, third paragraph, the rejection of claim 27 under 35 U.S.C. 112 second paragraph is withdrawn.

Turning to the 35 U.S.C. 102(e) rejection of claims 21-22, 24, 30, and 33 under the reference of Mizutani et al, applicant's arguments are not found to be persuasive. In response to applicant's argument that "there is no indication in Mizutani et al that the liquid supply nozzle 4 is mechanically isolated from the projection optical system Pl. Mizutani et al is silent as to how the supply nozzle 4 is connected to the lithography apparatus. Clearly, the supply nozzle 4 can not be merely suspended in air-it must be connected to something. Mizutani et al fails to identify this connection and Applicants submit that supply nozzle may be connected to the projection optical system (or its frame) such that the inlet port is not mechanically isolated from the projection optical system"; the Examiner respectfully disagrees with the applicant since there are several problems with applicant's analysis. Firstly, there is no evidence whatsoever the nozzle 4



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is connected to the projection optical system (or its frame) as guessed by applicants. As clearly illustrated from figure 1 of Mizutani et al, the supply nozzle 4 is connected to the liquid supply unit 1. Thus, Mizutani et al meets the claimed limitations because “the supply nozzle 4 is provided on a boundary of the space between the substrate and the projection optical system, not provided on the substrate table and mechanically isolated from the projection system”.

Secondly, as suggested by applicants, even if the nozzle is connected to the projection system (or its frame) in order to reduce unwanted vibration of an optical element in the projection system generated by the nozzle, one having ordinary skill in the art would employ (at least) a bellows (damper, an anti-vibration unit) between the nozzle and the projection optical system. This would be within the level of a skilled artisan.

Turning now to amended claim 30, the newly added limitation of “wherein the at least one immersion liquid outlet port is radially outwardly, relative to an optical axis of the projection system, of the at least one immersion liquid inlet port” is disclosed in the reference of Vogel’844 as discussed above.

Regarding the rejection of claims 23, 27 and 37 under 35 U.S.C. 103(a) as being obvious in view of Mizutani et al and Lin. Taken as a whole, it remains the position of the Examiner that the combination of Mizutani et al and Schuster and the combination of Mizutani and Lin, have disclosed every feature claimed by applicant in the above mentioned claims.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Henry V. Nguyen whose telephone number is 571-272-2124. The examiner can normally be reached on Monday-Friday (First Friday off).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**Hung Henry V Nguyen**  
**Primary Examiner**  
**Art Unit 2851**

hvn  
7/16/06